TRADE STRUCTURE ANALYSIS OF LATIN-AMERICA AND THE MERCOSUR COUNTRIES

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1. Preface of the doctoral research

In the last, approximately two decades emerging countries have gain more political and economic power. This tendency is mirrored both in their growing shares in world trade, investments and in official allowances or in the clearly observable tendency that these countries have bailed out quickly for the recent crisis, at least their economies were not as much impacted by the unfavorable processes throughout the world economy as the developed ones’. Developing regions, especially the powerful ones like Brazil, South-Africa, India or China, became more and more important players of the regional and global markets. OECD (2010) calls this phenomenon the shifting wealth. Several, yet developing countries, thus Latin-America, the object of this thesis, have the potential to grow and make an impact on the global processes. Expanding south-south relations are also signaling the above mentioned shift, the presence of globalization and its constant impact on regional and sub-regional trade.

Latin-American countries and the to be investigated economic integration, the Mercosur – and as a comparison sometimes the NAFTA – has taken significant steps regarding trade liberalization. The Mercosur has realized more and more firm institutional frameworks since its founding in the beginning of the 1990s; it has handled external or internal – social or economic – conflicts through agreements based on consensus.

International trade and the pattern of factor endowment have an impact on joining into the process of forming economic integrations. Depending on which phase of integration the economies are in, cost and benefits (that is the trade diverting and trade creating effects) can be different. In case of an integration it is worth investigating their nature, if they are shallow or deep integrations. To define the depth of an integration intra-industry trade can be uses as a proxy, therefore this research highlights the phenomena of intra-industry trade and examines how trade impacts the economic development and social welfare of certain regions. Moreover I consider the soothing effects of trade and flow of international production factors amidst unfavorable economic processes.
2. Objectives of the doctoral dissertation

According to the preface I investigate in detail (i.) the evolution of trade patterns and economic development within the Latin-American countries and the Mercosur (and at some points within NAFTA as a comparison); (ii.) how the changing world of economic integrations impacted the trade and especially the intra-industry trade of these counties and regions; (iii.) the evolution of the south-south trade relations.

In light of the above mentioned the objective of this research is to examine how trade patterns of the Latin-American region and the Mercosur countries have changed after liberalizing the markets; and to examine how and how intensely did the intra-industry trade show up in the region’s trade after liberalizing the trade.

My main motivation was that though parallel to the evolution of the theory there have been several empirical studies published concentrating on intra-industry trade, they remained limited and isolated from each other. There have not been any comprehensive studies involving or synthesising the methodological background.

Based on theoretical and empirical research I present new results regarding the economic development and evolution of trade regarding the forgotten continent, as Latin-America is often referred to. Conclusions coming from the analysis can later be translated and applied for other emerging markets being in similar stages of development especially when making economic or trade policy related decisions.

Phases of the doctoral research were presented in conferences and were published in reviewed journals in order to reach the scientific community. During teaching and thesis advising activities I my goals were to have the developing regions more well known among the students as well; I encouraged them to investigate the topic further.

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1 The booklet was amended based on the feedbacks received at the defense lecture.
3. Structure and applied methodology

After stating the objectives and goals of the doctoral research in the preface, in the 2nd chapter I present the place of Latin-American region within the world economy compared to other developing regions both in absolute and in relative terms. The 3rd chapter deals with the forms and effects of economic and trade liberalization in historical perspective. The 4th chapter presents the history of Mercosur, steps of laying its institutional frameworks, the deepening of its trade and the shares of its members from it. The 5th chapter deals with the theory of deep and shallow integrations and investigates the presence of theory through intra-industry trade analysis in case of Mercosur and NAFTA. The 6th chapter introduces further indices of intra-industry trade in order to examine the trade patterns of SITC 7 products for two selected county pairs: Argentina-Brazil and Mexico-USA. In the 7th chapter I widen the frameworks of the research with two additional dimensions. I analyze between 1996 and 2012 the changes in the structure of trade for Mercosur countries along technology intensity and the broad economic categories. Chapter 8 states the propositions of the dissertation and chapter 9 suggests further directions for the research.

As a first step in research I revised both the Hungarian and international economic literature. Studying the publications of the World Trade Organization, ECLAC, World Bank and OECD were of help to understand the tendencies behind the social and economic changes.

Using data from the UN Comtrade database and with the help of Microsoft Excel, R and SPSS I calculated the different – Grubel-Lloyd (1975), Fontagné-Freudenberg (1997), Shelburne (1993), Brülhart (1994) – indices of intra-industry trade. With these I was able to present a more thorough analysis of the processes of economic integrations and with the method of Azhar–Elliott (2011) the results were presentable in geometrical forms as well. As a final step I integrated into the Azhar–Chen–Khalifah method (Azhar—Chen–Khalifah, 2012) two additional dimensions of research – the Lall (Lall, 2000) and BEC categories – through which I was able to examine changes in export and import structures on the product level.

Scope of the research covers the Latin-American region, especially the Mercosur countries and as a comparison in some cases the NAFTA as well. Analysis of developing regions goes back to
the 1970s, 1980s while the empirical research was highly dependent on the availability of data or in certain cases – eg. in case of Argentina – on their trustworthiness.

4. Propositions of the dissertation

In general there was an observable tendency in Latin America from the 1980’s until the late 1990’s that as a result of the liberalizing waves – in forms of the first and second generation reforms- economies became only slightly more open (Duran et al., 2008). Consequently the four founding members of Mercosur directed their trade policies towards further liberalization. During the first 20 years the integration’s internal trade produced a 20-fold growth both in intra-export and in intra-import. Liberalization accelerated and by the millennial the average trade turnover grew from 50 billion to 100 billion dollars, reaching its peak after the Argentine crisis in 2002. By 2008 the turnover reached 300 billion dollars and between 2009 and 2011 the 350 billion. One of the supporting factors behind the growth was the soaring commodity prices after the millennial.

*Figure 1: Total trade of Mercosur (billion USD)*

*Source: author’s calculations based on the UN Comtrade database*
It is also true that the extent of the trade influencing bureaucracy is lower relative to other developing regions’ however the deepening of liberalization is largely constrained by overprotecting the industries attributed as crucial strategic ones. These industries in most cases are either fully exempted from tariff reductions or are enjoying moderate levels of reduction. Efficiency of liberalization can also be undermined by the dissecting of the multilateral trade system, under which I understand the growing number of integrations overlapping both in geographical territories and in contents covered under the agreements.

The Latin American region has already introduced strategic reforms as early as the 1970’s (eg. Argentina and Uruguay), however the crisis of 1985 practically annulled the resurging positive outcomes. The next wave of reforms could only begin after the late 1980’s. Based on the strength of the reforms, Argentina and Uruguay are considered strong reformers, while Brazil and Paraguay are intermediate ones. Interestingly, the former two countries introduced their comprehensive reform packages in 1991, in the year they declared their intent to found Mercosur. The latter two introduced the reforms only in 1994 when the members were parallelly creating the institutional frameworks of the integration. Having a look from other perspectives, Argentina can be declared as aggressive reformer – introducing several reforms in a short period of time –, and Brazil as a cautious reformer. Aggressive reformers suffered previously from hyperinflation, they faced stagnation or negative growth and the level of governability was low. Cautious reformers were struggling with high inflation but not with hyperinflation, they faced slow growth but not negative and the level of governability was high or intermediate.

Once we compare the effects of liberalization to that of other countries’, – for example in my case to the NAFTA’s or to the Mexico-USA trade relations – the following conclusions can be drawn regarding the depths of the integrations. While NAFTA not just eliminated all barriers in its internal trade but also considered additional fields and topics; Mercosur got stuck on the level of a customs union. Per se it has to be deemed as huge achievements if we take into consideration the continent’s rough history; however the real effects trade and economic liberalization coming from the integration processes was only to be felt and turning intense after the millennial.
Thesis 1. NAFTA is a typical example of deep integrations, while Mercosur operates as a shallow integration. Moreover, because of the from tariff reduction exempted products are still in a relatively high number, Mercosur cannot even reach the full-shallow state within the shallow category of integrations. Mercosur cannot reach free trade, not even on the level of trade in goods.

Liberalization during the integration processes can induce adjustment costs, which can be measured by intra industry indices. The reasoning behind this is that structural changes and reallocations of the resources are causing lower adjustment costs, if these changes are happening within the industries. Development of the theory of IIT went hand in hand with the development of the measuring apparatus. After the quantity based approaches quality became accented as well. The former served mainly to differentiate between inter-and intra-industry flows, while with the latter based on Stiglitz (1987) it became possible to separate lower and higher quality products, that is to make difference between horizontal and vertical intra-industry trade flows. The next step became the differentiation between static and dynamic measurements and indices. Azhar–Elliott (2003), (2006), (2008), Azhar–Chen–Khalifah (2012) elaborated the measurement system further by considering parallel both on quantity and quality induced adjustment costs. Based on the most recent methods of Azhar–Elliott (2011) and Azhar–Elliott–Liu (2012) it is possible to geometrically visualize the positions of the industries/products’ under investigation.
Figure 2: The quality adjusted trade adjustment space (QTAS)

Aggregational bias regarding IIT measurements was supported by the research. In case of Argentina-Brazil and Argentina-Uruguay IIT indices were in general 30 percentage points higher when the data was 3-digit aggregate compared to when it was 6-digit aggregate. For the remaining country pairs the difference was in average 10 percentage points.

Growing share of IIT between the investigated country pairs – especially in case of Argentina-Brazil, Argentina-Uruguay, Brazil-Uruguay and Uruguay-Paraguay – shows the signs of harmonizing economic cycles. Moreover, this tendency of harmonization was visible even for those country pairs where economic cycles were mostly synchronized apriori. Masoller (1998) has already proved co-movement of economic cycles in case of Argentina and Uruguay. Bevilaqua et al. (2001) observed other components of the idiosyncratic trade patterns which can contribute to co-movements. Sosa (2010) investigated the importance of Brazil as the big brother in the region. Erdey (2004) found that since there is a strong connection between trade and economic cycles, the harmonization of business cycles can be witnessed – with constraints of course – as a consequence of the integrating markets.
Thesis 2. Growth of IIT shares is visible for those countries as well, where economic cycles had already been synchronized apriori.

After the foundation of Mercosur in 1991 a relatively high growth is observable within the GL indices. Crises and unfavorable world economic conditions are standing out as decreasing IIT values. For the manufacturing industries IIT values are clearly higher than for the total trade which is in accordance with theory. Based on the calculations done with the Fontagné-Freudenberg method the most significant volume of two-way trade was between Argentina-Brazil and Argentina-Uruguay; somewhat lower between Brazil-Uruguay and Uruguay-Paraguay. After separating horizontal (HIIT) and vertical (VIIT) intra-industry flow by using HS 6-digit data I found that the for Mercosur expected higher HIIT values were only observable when filtering for the manufacturing industries and even for these industries VIIT showed a catching up tendency in the argentine-brazil relations after the millennials.

Thesis 3. In case of those Mercosur countries that have similar factor endowments the expected higher HIIT rate was only observable for the manufacturing industries; VIIT showed a closing up tendency after the millennial for the Argentina-Brazil trade relation; for the remaining country pairs VIIT was relatively higher from the beginning of the research.

In the next phase, I used the Shelburne and Brühlhart indices to differentiate between the static and dynamic measurements and to be able to investigate the dynamics of intra-industry trade flows and their adjustment cost mitigating effect. I found the marginal IIT flows to be in accordance with the structural and global economic crises; showing higher values in times of more stable economic conditions and eras. The results showed that in the long run changes in trade were not obviously due to intra-industry flows. For comparative purposes I repeated the measurements for NAFTA countries as well, and my conclusions turned out to be similar as for the case of Mercosur.

Thesis 4. Based on the NAFTA’s and Mercosur’s examples it can be concluded that the adjustment cost reducing effects of intra industry trade through marginal flows do not depend on the depths of the integration.
To support the importance of investigating quality induced adjustment costs I used the Azhar-Elliott method for the pulling forces of Mercosur and NAFTA, that is for the bilateral trade in between Argentina-Brazil and Mexico-USA. For both relations several SITC 7 products were to be found where either the change in quality or the changes both in quality and quantity had significant adjustment costs inducing effects.

**Thesis 5.** With the Azhar–Elliott indices I was able to prove, that besides the so far observed quantity changes we have to consider the changes in quality as well, since they can also generate adjustment costs. Quality induced adjustment costs can in some cases be significant, so they have to be taken into consideration. In the Argentina-Brazil relation both the static PQV and the dynamic MQ and VQ indices showed quality decrease of the Argentine export which means a relative loss in its position to Brazil.

In order to synthetize the IIT analyses and the studies on the Mercosur countries’ structural changes in trade, as a final step I expanded the Azhar–Chen–Khalifah (ACK) method with two additional dimensions. By including Lall’s technological classifications and the BEC categories I created a complex, integrated framework which enabled me to observe structural changes– both for export and import – on the product level and induced by either of the above mentioned dimensions.
### Table 1: Lall’s technological classification of exports

<table>
<thead>
<tr>
<th>Classification</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary products</strong></td>
<td>Fresh fruit, meat, rice, cocoa, tea, coffee, wood, coal, crude petroleum, gas</td>
</tr>
<tr>
<td><strong>Manufactured products</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Resource based</strong></td>
<td>Prepared meats/fruits, beverages, wood products, vegetable oils, ore concentrates, petroleum/rubber products, cement, cut gems, glass</td>
</tr>
<tr>
<td><strong>Low technology manufactures</strong></td>
<td>Textile fabrics, clothing, headgear, footwear, leather manufactures, travel goods, pottery, simple metal parts/structures, furniture, jewellery, toys, plastic products</td>
</tr>
<tr>
<td><strong>Medium technology manufactures</strong></td>
<td>Passenger vehicles and parts, commercial vehicles, motorcycles and parts, synthetic fibres, chemicals and paints, fertilizers, plastics, iron, pipes/tubes, engines, motors, industrial machinery, pumps, switchgear, ships, watches</td>
</tr>
<tr>
<td><strong>High technology manufactures</strong></td>
<td>Office/data processing/telecommunications equip, TVs, transistors, turbines, power generating equipment, pharmaceuticals, aerospace, optical/measuring instruments, cameras</td>
</tr>
</tbody>
</table>

Source: Lall (2000), pp. 7.

### Table 2: BEC categories

<table>
<thead>
<tr>
<th>BEC 1 Levels</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEC-1</td>
<td>Food and beverages</td>
</tr>
<tr>
<td>BEC-2</td>
<td>Industrial supplies not elsewhere specified</td>
</tr>
<tr>
<td>BEC-3</td>
<td>Fuels and lubricants</td>
</tr>
<tr>
<td>BEC-4</td>
<td>Capital goods (except transport equipment), and parts and accessories thereof</td>
</tr>
<tr>
<td>BEC-5</td>
<td>Transport equipment and parts and accessories thereof</td>
</tr>
<tr>
<td>BEC-6</td>
<td>Consumer goods not elsewhere specified</td>
</tr>
<tr>
<td>BEC-7</td>
<td>Goods not elsewhere specified</td>
</tr>
</tbody>
</table>

Source: author’s compilation

Realignment of trade in manufactures can refer to structural changes but also to a certain shift in the static comparative advantages. With the expanded ACK method I investigated sings of change in marginal exports and imports. In other words I was able to observe the technology
intensity of products in highly matched trade. I also examined adjustment costs induces by quality changes to determine the technology intensity of these products.

Those countries that were able to become somewhat independent of the trade in primary products could step on potentially more stable growth path in the long run. Being less dependent on the fluctuation of commodity prices countries become less prone to the resource course, otherwise not unfamiliar for the Latin American community. Based on the empirical results, Mercosur countries showed a shift towards low (LT)-, middle (MT)- and high technology (HT) intensive products’ trade in their matched trade, or realignment within these categories. LT and MT industrial supplies and consumer goods (and partially capital goods) had growing shares in many cases. Resource based products also registered changes in their shares. HT products (capital goods and consumer goods) remained relatively significant for Argentina-Uruguay, Brazil-Uruguay and for Uruguay-Paraguay or at least rebounded in the last period. Interestingly the most changes in the structure of intensely traded products were observable in the second and third periods.

**Thesis 6.** Investigating the trade structure with the enhanced ACK method it can be concluded that between 2000-2004 several country pairs and between 2004-2008 all country pairs witnessed a change in structure regarding their matched trade.

I was also indirectly examining the progress of industrialization within the Mercosur countries as in the early phases it is common to observe increasing shares of low technology intense products instead of primary products. I was able to find evidence of such tendencies for Mercosur, as mentioned in chapter 7.

**Thesis 7.** Between 1996 and 2012 the considered Mercosur countries showed a growing ratio of technology intense products in their matched trade which means higher levels (in some cases stepping forward more levels as well) of industrialization.

Changes in the structure of marginal trade were mostly gradual except for the period between 2000 and 2004 when almost all examined trade relation showed changes in their trade patterns. These realignments were in general due to reactions to shocks hitting the macroeconomical
environment, such as the argentine crisis and its spillover effects withing the Latin American region. Understanding the idiosyncratic patterns during other periods would require more in depth research on the microeconomic level to analyse the effects of trade policy decisions. This is however out of scope of the current research.

5. Further directions of research

Export survival – durations of trade relations in Latin-America
Export led growth is a well-documented phenomenon\(^2\) in economic theory therefore it has a central role in several scientific literature dealing with economic development or growth theory. Export led growth was mainly tested on Latin-American or East Asian economies that opened up their economies with reform packages aiming liberalization. Insufficient growth might be a result of several background factors\(^3\): Hausmann–Rodrik (2003), Hausmann–Rodriguez–Wagner (2006), Besedes–Prusa (2006), (2011), Besedes–Blyde (2010), North (1990), Williamson (2000), Acemoglu et al. (2004), Levchenko (2007), Boettke et al. (2008), Czeglédi – Kapás (2009). Ranjan–Lee (2007), Araujo et al. (2012), Aeberhart et al. (2012), Sabel (2012), Besedes (2013) and Besedes–Prusa (2013) are all investigating the possible driving forces behind trade enhancement.

Recent studies of Besedes and Besedes–Prusa are dealing with a new and exciting approach, namely the survival of export relations. According to the authors duration of trade relations are a significant factor when considering export led growth. It is also absorbed by Besedes (2013) that among members of regional integrations the risk of survival is clearly lower than in case of trade relations with third parties.

It is possible that the poor export performance of certain Latin American countries despite the well-aimed reform packages in the 1990’s was a result of low export survival rates. The Inter-American Development Bank’s recent study (IDB, 2012) introduces export pioneers in the Latin American region and draws attention to the underlying key factors for behind both success

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\(^2\) Araujo et al. (2015) shows examples of the other side of the causality when growth is driving exports.

\(^3\) See Zettelmeyer (2006) for a comprehensive study on the subject.
stories and failures. In my future research I plan to focus on the patterns of export survival in the Latin American region.

6. References


Comtrade (2014): UN Comtrade Database, DESA/UNSD


Sosa, S. (2010): *The Influence of “Big Brothers”: How Important are Regional Factors for Uruguay?*. IMF Working Paper, Western Hemisphere Department, WP/10/60


7. Publications of the candidate


Conference lectures

2010. December Conference of University of Debrecen, Faculty of Economics and Business Administration, Debrecen, Lecture: Mercosur from Trade Theory perspectives (with Dr. Erdey László)


2011. November Conference of University of Debrecen, Faculty of Economics and Business Administration, with Dr. Erdey László. Lecture: Regional integrations and adjustment costs in case of MERCOSUR and NAFTA.

2012. April Conference of University of Debrecen, Faculty of Economics and Business Administration, with Dr. Erdey László. Lecture: Intra-industry trade measurements – the case of Mercosur és a NAFTA.

2013. May Conference of University of Debrecen, Faculty of Economics and Business Administration, with Dr. Erdey László. Lecture: Trade patterns of Argentina–Brazil and Mexico–USA. An analysis with the intra-industry trade indices.
List of publications related to the dissertation

Article(s), studies (4)


The Candidate's publication data submitted to the iDEa Tudóstér have been validated by DEENK on the basis of Web of Science, Scopus and Journal Citation Report (Impact Factor) databases.

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